



Connect Router to the Network

- [Port Connection Guidelines](#) , on page 1
- [Interfaces and Port Description](#), on page 2
- [Connecting a Console to the Router](#), on page 8
- [Create the Initial Router Configuration](#), on page 9
- [Connect the Management Interface](#), on page 11
- [Install Dust Caps](#), on page 12
- [Install and Remove Transceiver Modules](#), on page 12
- [Connect Interface Ports](#), on page 19
- [Maintain Transceivers and Optical Cables](#), on page 20
- [Verify Chassis Installation](#), on page 20

Port Connection Guidelines

Depending on the chassis , you can use optical modules and RJ-45 connectors to connect the ports to other network devices.

To prevent damage to the fiber-optic cables, we recommend that you keep the transceivers disconnected from their fiber-optic cables when installing the transceiver in the line card. Before removing a transceiver from the router, remove the cable from the transceiver.

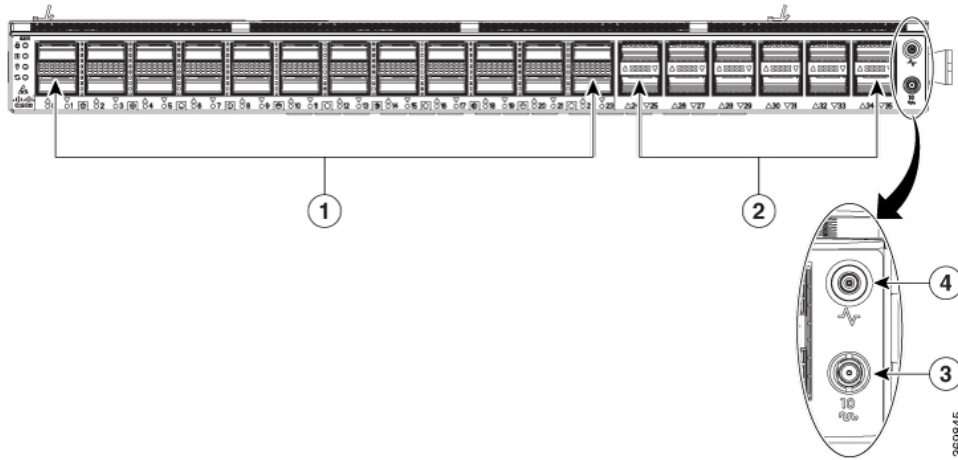
To maximize the effectiveness and life of your transceivers and optical cables, ensure the following:

- Wear an ESD-preventative wrist strap that is connected to an earth ground whenever you handle transceivers.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its useful life.
- Keep the transceivers and fiber-optic cables clean and dust free to maintain high signal accuracy and to prevent damage to the connectors. Attenuation (loss of light) is increased by contamination. Connector loss should be kept below 0.35 dB.
 - Clean these parts before installation to prevent dust from scratching the fiber-optic cable ends.
 - Clean the connectors regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors when they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to your site's fiber-optic connection cleaning procedures.

- Do not touch the ends of connectors. Touching the ends can leave fingerprints and cause other contamination.
- Inspect routinely for dust and damage. If you suspect damage, clean and then inspect fiber ends under a microscope to determine if damage has occurred.

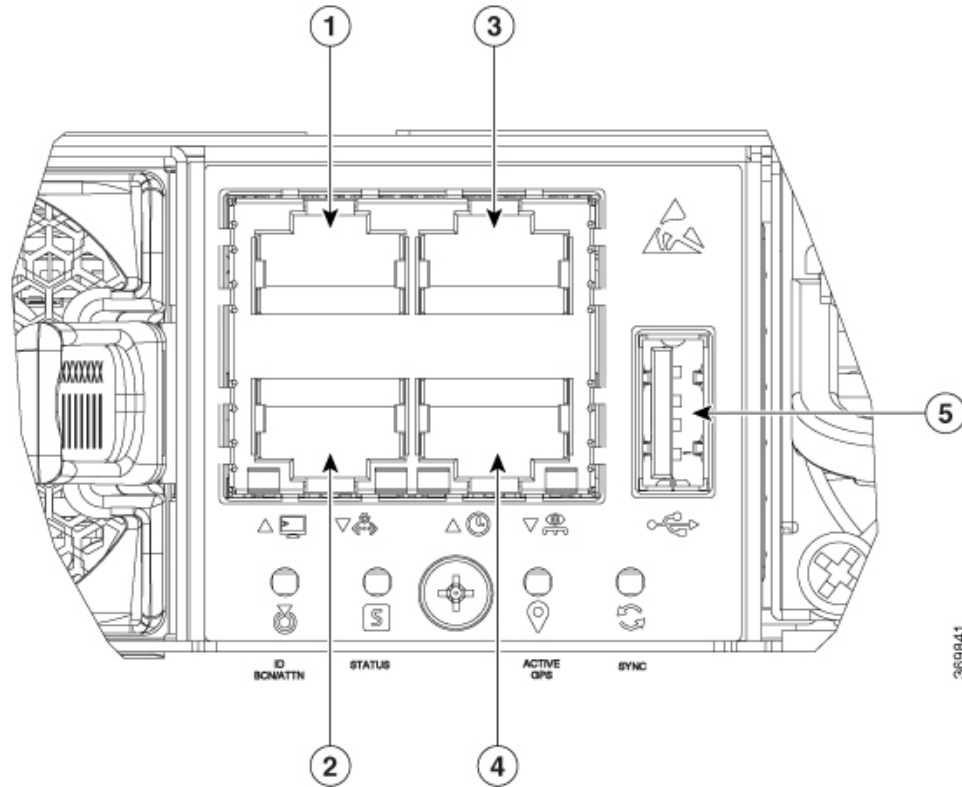
Interfaces and Port Description

Figure 1: Cisco 8201 Fixed Port Router - Front View



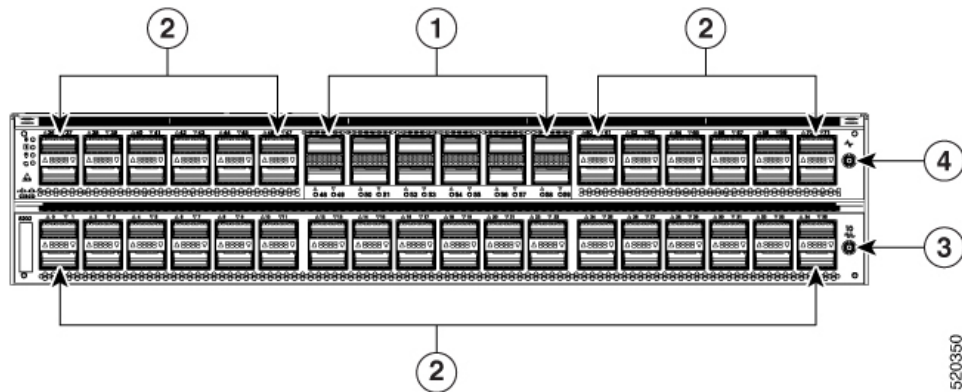
1	400G Ports (Port 0 to Port 23). 400G port supports 40GE, 100GE, 200GE, and 400GE. All 400G port support breakout operation.	3	Mini coax connector for 10MHz, input, and output.
2	100G ports (Port 24 to Port 35) support 100G and 40G. Ports 24, 26, 28, 30, 32, and 34 support 4x10G and 4x50G via breakout cable.	4	Mini coax connector for 1 PPS, input, and output.

Figure 2: Cisco 8201 Fixed Port Router - Rear View



1	Console Port	4	1000BASE-T Management and BMC (Base Controller) Port
2	10GBASE-T Control Plane Expansion Port	5	USB Port Type-A
3	RJ-45 connector for Time-of-Day (TOD) interface, input, and output		

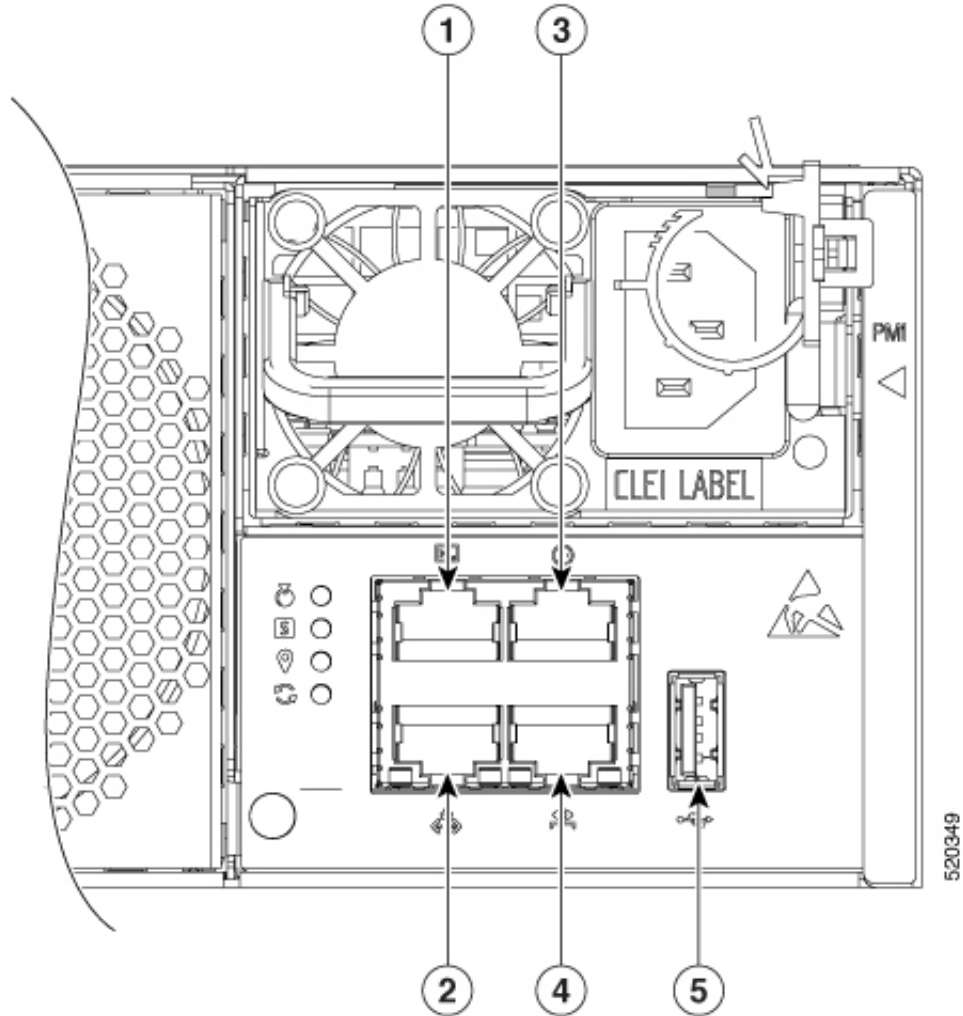
Figure 3: Cisco 8202 Fixed Port Router - Front View



1	400G Ports. All 400G port support breakout operation.	3	1.0/2.3 50 ohm connector for 10MHz, inf
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2	100G ports and even ports support 4x10G and 4x50G	4	1.0/2.3 50 ohm connector for 1 PPS, input, and
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Figure 4: Cisco 8202 Fixed Port Router - Rear View



1	Console Port	4	1000BASE-T Management and BMC (Baseboard Controller) Port
2	10GBASE-T Control Plane Expansion Port	5	USB Port Type-A
3	RJ-45 connector for Time-of-Day (TOD) interface, input, and output		

Figure 5: Cisco 8201-32FH Router - Front View

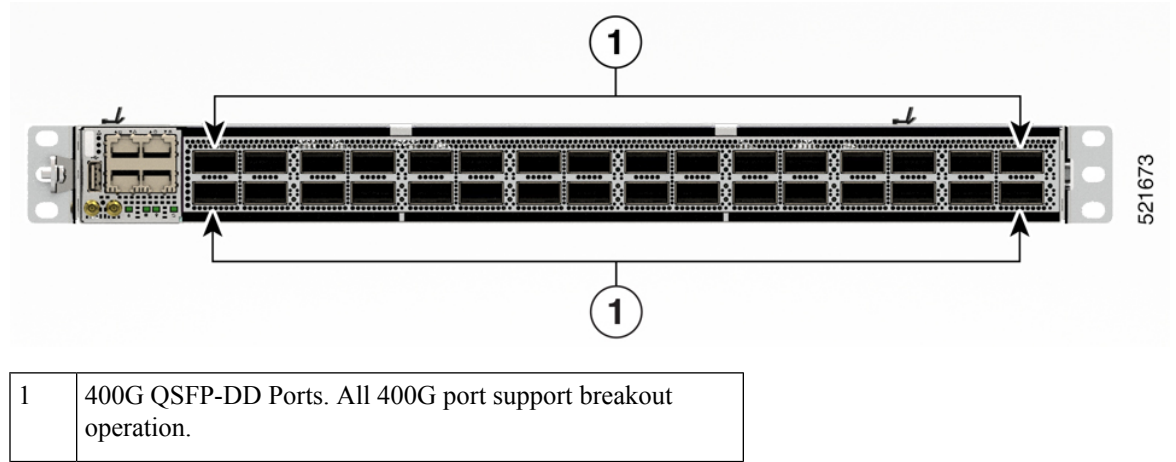


Figure 6: Cisco 8201-32FH Router - Rear View

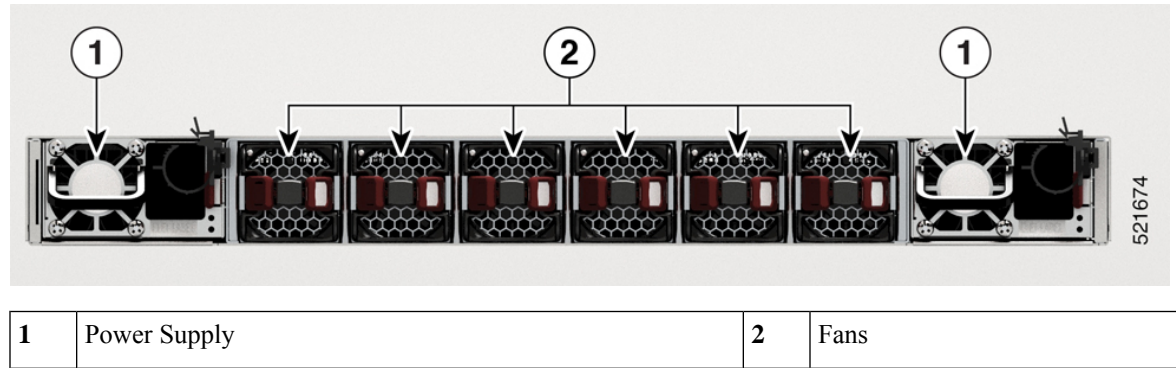
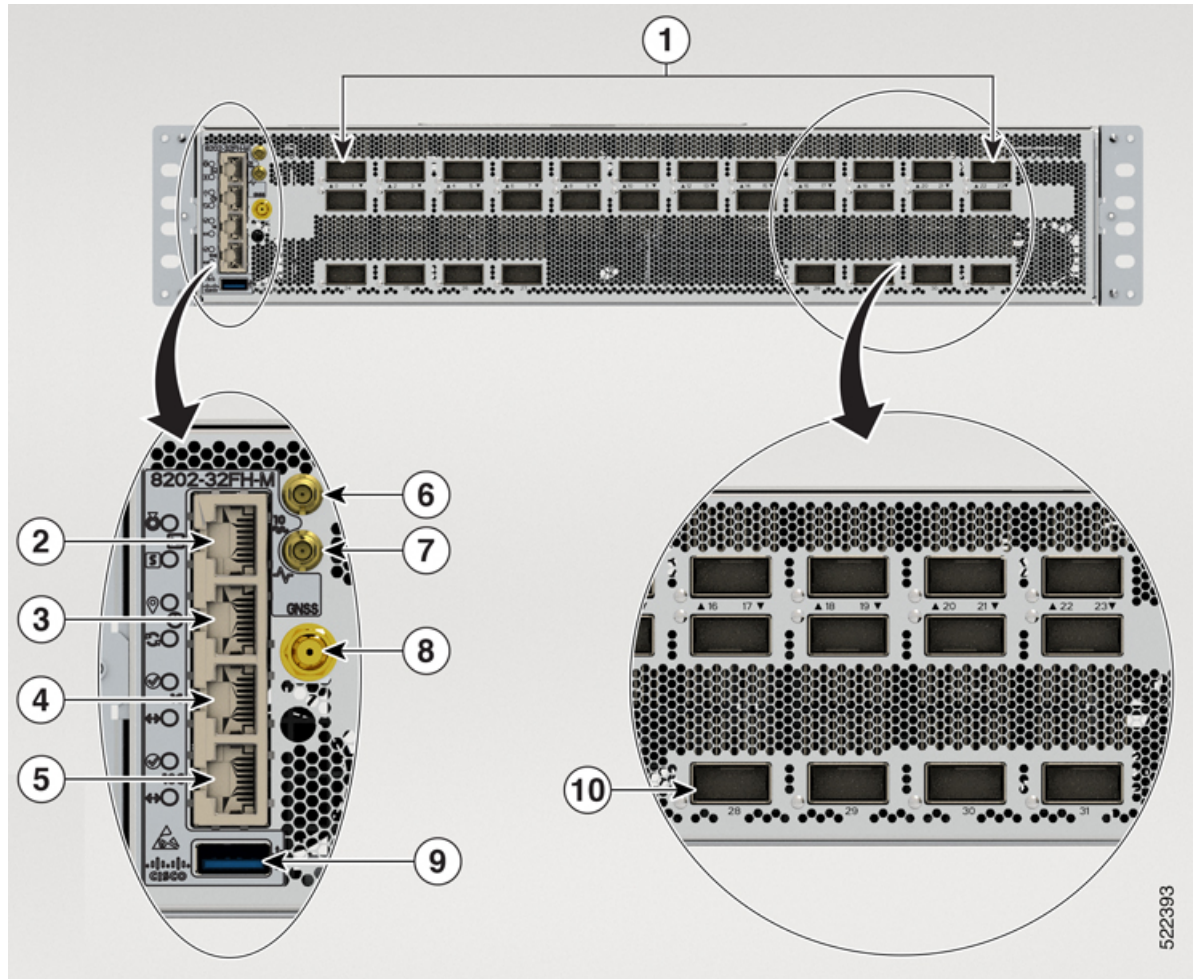
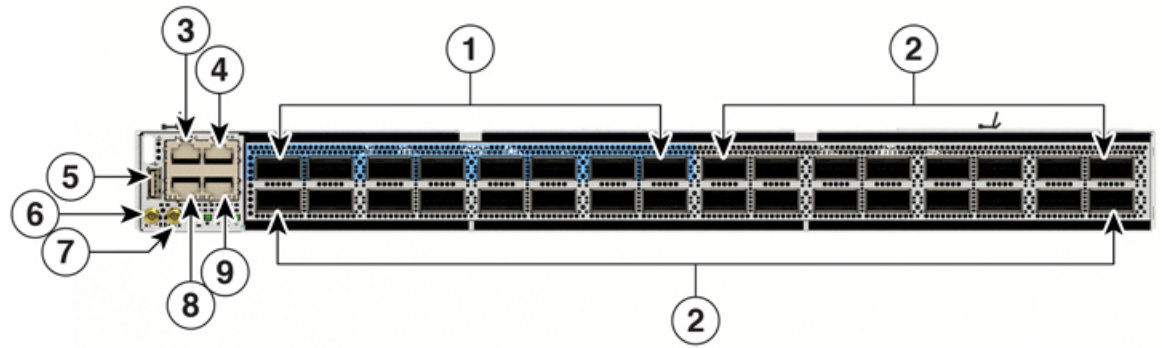


Figure 7: Cisco 8202-32FH-M Router - Front View



1	400G QSFP-DD Ports. All 400G port support breakout operation.	6	Mini coax connector for 1 PPS, input, and output.
2	Console	7	Mini coax connector for 10MHz, input, and output.
3	Time of the Day (TOD) Port	8	GNSS Port
4	1G Management Port	9	USB Port Type-A
5	10G Control Plane Expansion Port	10	400G QSFP-DD Ports. All 400G port support breakout operation.

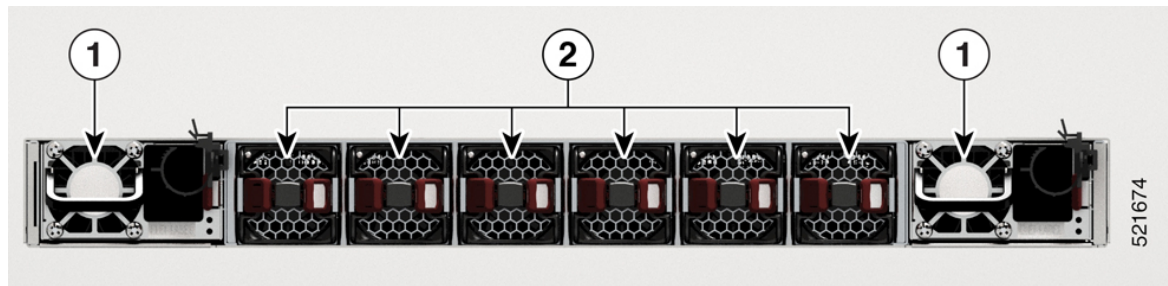
Figure 8: Cisco 8201-24H8FH Router - Front View



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1	8 QSFP-DD 400 GbE ports. All 400 GbE ports support breakout operation: <ul style="list-style-type: none"> • 2x100 GbE • 4x100 GbE • 4x10 GbE • 4x25 GbE • 8x50 GbE • 2x40 GbE 	6	Mini coax connector for 10MHz, input, and output.
2	24 QSFP28 100 GbE ports. All 100 GbE ports support breakout operation: <ul style="list-style-type: none"> • 4x10 GbE • 4x25 GbE • 2x50 GbE • 2x40 GbE 	7	Mini coax connector for 1 PPS, input, and output.
3	Console port.	8	10GBASE-T Control Plane Expansion Port
4	RJ-45 connector for Time-of-Day (TOD) interface, input, and output.	9	1000BASE-T Management and BMC (Baseband Controller) Port
5	USB Port Type-A.		

Figure 9: Cisco 8201-24H8FH Router - Rear View



1	Power Supply	2	Fans
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Transceiver and Cable Specifications

To determine which transceivers and cables are supported by this router, refer to the Transceiver Module Group (TMG) Compatibility Matrix Tool:

<https://tmgmatrix.cisco.com/home>

- For QSFP-DD data sheets, refer to the [Cisco 400G QSFP-DD Cable and Transceiver Modules Data Sheet](#).
- For QSFP28 data sheets, refer to the [Cisco 100GBASE QSFP-100G Modules Data Sheet](#).
- For QSFP+ data sheets, refer to the [Cisco 40GBASE QSFP Modules Data Sheet](#).

Connecting a Console to the Router

Before you create a network management connection for the router or connect the router to the network, you must create a local management connection through a console terminal and configure an IP address for the router. The router can be accessed using remote management protocols, such as SSH and Telnet. By default, SSH is included in the software image. But telnet is not part of the software image. You must manually install the telnet optional package to use it.

You also can use the console to perform the following functions, each of which can be performed through the management interface after you make that connection:

- configure the router using the command-line interface (CLI)
- monitor network statistics and errors
- configure Simple Network Management Protocol (SNMP) agent parameters
- initiate software download updates via console

You make this local management connection between the asynchronous serial port on a console device capable of asynchronous transmission. Typically, you can use a computer terminal as the console device.



Note Before you can connect the console port to a computer terminal, make sure that the computer terminal supports VT100 terminal emulation. The terminal emulation software makes communication between the router and computer possible during setup and configuration.

Before you begin

- The router must be fully installed in its rack. The router must be connected to a power source and grounded.
- The necessary cabling for the console, management, and network connections must be available.
 - An RJ45 rollover cable and a DB9F/RJ45 adapter.
 - Network cabling should already be routed to the location of the installed router.

Step 1 Configure the console device to match the following default port characteristics:

- 115200 baud
- 8 data bits
- 1 stop bit
- No parity

Step 2 Connect an RJ45 rollover cable to a terminal, PC terminal emulator, or terminal server.

The RJ45 rollover cable is not part of the accessory kit.

Step 3 Route the RJ45 rollover cable as appropriate and connect the cable to the console port on the chassis.

If the console or modem cannot use an RJ45 connection, use the DB9F/RJ45F PC terminal adapter. Alternatively, you can use an RJ45/DSUB F/F or RJ45/DSUB R/P adapter, but you must provide those adapters.

What to do next

You are ready to create the initial router configuration.

Create the Initial Router Configuration

Assign an IP address to the router management interface to connect the router to the network.

When you initially power up the router, it boots up and displays a series of configuration-related questions. You can use the default choices for each configuration except for the IP address, which you must provide.



Note These routers are designed to boot up in less than 30 mins, provided the neighboring devices are in full-operational state.

When the system is powered on and the console port is connected to the terminal, the RP CPU messages are seen. You can toggle between BMC CPU messages and RP CPU messages by pressing the hot-key sequence Ctrl-O.



Note The Cisco 8201-32FH and Cisco 8201-24H8FH Routers do not support BMC.

To configure IP address for Ethernet port on BMC and other additional information that is related to BMC, please see the *System Setup Guide for Cisco 8000 Series Routers*.

Before you begin

- A console device must be connected with the router.
- The router must be connected to a power source.
- Determine the IP address and netmask that is needed for the Management interfaces: MgmtEth0/RP0/CPU0/0

Step 1 Power up the router.

The LEDs on each power supply light up (green) when the power supply units are sending power to the router, and the software asks you to specify a password to use with the router.

Step 2 When the system boots up for the first time, the system prompts you to create a new username and password. The following prompt appears:

```
!!!!!!!!!!!!!!!!!!!!!! NO root-system username is configured. Need to configure root-system username.
!!!!!!!!!!!!!!!!!!!!!!

--- Administrative User Dialog ---

Enter root-system username:
% Entry must not be null.

Enter root-system username: cisco
Enter secret:
Use the 'configure' command to modify this configuration.
User Access Verification

Username: cisco
Password:

RP/0/RP0/CPU0:ios#
```

Step 3 Enter a new password to use for this router.

The software checks the security strength of your password and rejects your password if the system does not consider it as a strong password. To increase the security strength of your password, make sure that it adheres to the following guidelines:

- At least eight characters
- Minimizes or avoids the use of consecutive characters (such as "abcd")

- Minimizes or avoids repeating characters (such as "AAA")
- Does not contain recognizable words in the dictionary
- Does not contain proper names
- Contains both uppercase and lowercase characters
- Contains numbers and letters

Note Cleartext passwords cannot include the dollar sign (\$) special character.

Tip If a password is trivial (such as a short, easy-to-decipher password), the software rejects that password. Passwords are case-sensitive.

When you enter a strong password, the software asks you to confirm the password.

Step 4 Reenter the password.

When you enter the same password, the software accepts the password.

Step 5 Enter the configuration mode.

Step 6 Enter the IP address for the management interface.

Step 7 Enter a network mask for the management interface.

Step 8 The software asks whether you want to edit the configuration. Enter 'no' to decline.

Connect the Management Interface

The management port (MGMT ETH) provides out-of-band management, which lets you to use the command-line interface (CLI) to manage the router by its IP address. This port uses a 10/100/1000 Ethernet connection with an RJ-45 interface.



Caution To prevent an IP address conflict, do not connect the MGMT 100/1000 Ethernet port until the initial configuration is complete.

Before you begin

You must have completed the initial router configuration.

Step 1 Connect a modular, RJ-45, UTP cable to the MGMT ETH port.

Step 2 Route the cable through the central slot in the cable management system.

Step 3 Connect the other end of the cable to a 100/1000 Ethernet port on a network device.

What to do next

You are ready to connect the interface ports to the network.

Install Dust Caps

Install dust caps to protect unused or unconnected optical ports on the Cisco 8200 Series Routers.

The following list provides the product IDs (PIDs) for the dust caps that are available for each port type:

PID	Description
8000-QSFP-DCAP	Cisco 8000 Series Dust cover for SFP/ZSFP (Qty: 1 per Kit)



Note Dust caps are orderable separately from Cisco and are available for a variety of input/output connectors.

Figure 10: Dust Cap



To install the dust cap:

1. Hold the dust cap by its handle.
2. Insert the dust cap in to the appropriate unused ports (SFP, QSFP, CFP2) on the chassis.

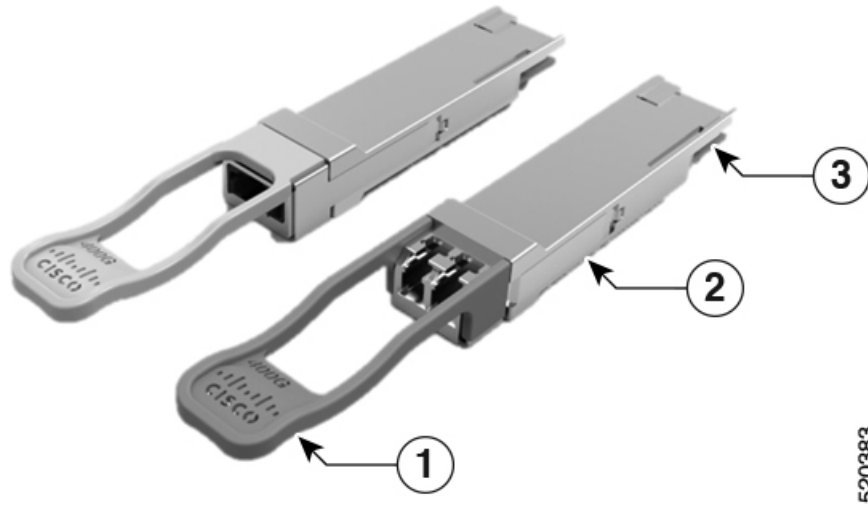
Install and Remove Transceiver Modules

Install and Remove QSFP Transceiver Modules

This section provides the installation, cabling, and removal instructions for the Quad Small Form-Factor Pluggable transceiver modules. Refer to the [Cisco Optical Transceiver Handling Guide](#) for additional details on optical transceivers.

The following figure shows a 400-Gigabit QSFP-DD optical transceiver.

Figure 11: 400-Gigabit QSFP-DD Transceiver Module



1	Pull-tab	2	QSFP-DD transceiver body
3	Electrical connection to the module circuitry		



Warning Statement 1079—Hot Surface

This icon is a hot surface warning. To avoid personal injury, do not touch without proper protection.



Required Tools and Equipment

You need these tools to install the transceiver modules:

- Wrist strap or other personal grounding device to prevent ESD occurrences.
- Antistatic mat or antistatic foam to set the transceiver on.
- Fiber-optic end-face cleaning tools and inspection equipment.

Installing the Transceiver Module



Warning Statement 1079—Hot Surface

This icon is a hot surface warning. To avoid personal injury, do not touch without proper protection.



Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with system modules.



Caution Protect the transceiver ports by inserting clean dust caps (8000-QSFP-DCAP) into any ports not in use and do not have optical modules plugged in. If optical modules are plugged in but not in use, the dust caps that were supplied with the optical modules, should be used to protect the TX and RX surfaces of the optical module.

Be sure to clean the optic surfaces of the fiber cables before you plug them back into the optical ports of another module.

The router ships with dust caps plugged in. We highly recommend you to keep the dust caps plugged in until you are ready to plug an optic.

The dust caps protect the ports from possible EMI interference and also avoid contamination due to dust collection. To meet the EMI interference requirements, you must use the metal dust caps when the ports are not in use by optical modules.

The following table provides the supported port details and operating temperature of the QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules when port side exhaust or port side intake fans and power supplies are used.

Table 1: Supported Ports and Operating Temperature of QDD-400G-ZR-S and QDD-400G-ZRP-S Optical Modules

Fixed-Port Routers	Port Side Intake Fans and Power Supplies	Port Side Exhaust Fans and Power Supplies	Port Side Intake Operating Temperature
Cisco 8201	<ul style="list-style-type: none"> • QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on even-numbered 400G ports 	<ul style="list-style-type: none"> • QDD-400G-ZR-S – not supported • QDD-400G-ZRP-S – not supported 	40° C at sea level or 35° C at 1500 meter

Cisco 8202	<ul style="list-style-type: none"> • QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on even-numbered 400G ports 	<ul style="list-style-type: none"> • QDD-400G-ZR-S – not supported • QDD-400G-ZRP-S – not supported 	40° C at sea level or 35° C at 1500 meter
8201-32FH	<ul style="list-style-type: none"> • QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on even-numbered 400G ports 	<ul style="list-style-type: none"> • QDD-400G-ZR-S – not supported • QDD-400G-ZRP-S – not supported 	40° C at sea level or 35° C at 1500 meter
Cisco 8201-24H8FH	<ul style="list-style-type: none"> • QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on all 400G ports 	<ul style="list-style-type: none"> • QDD-400G-ZR-S – not supported • QDD-400G-ZRP-S – not supported 	40° C at sea level or 35° C at 1500 meter
8202-32FH-M	<ul style="list-style-type: none"> • QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on all 400G ports 	NA	40° C at sea level or 35° C at 1500 meter

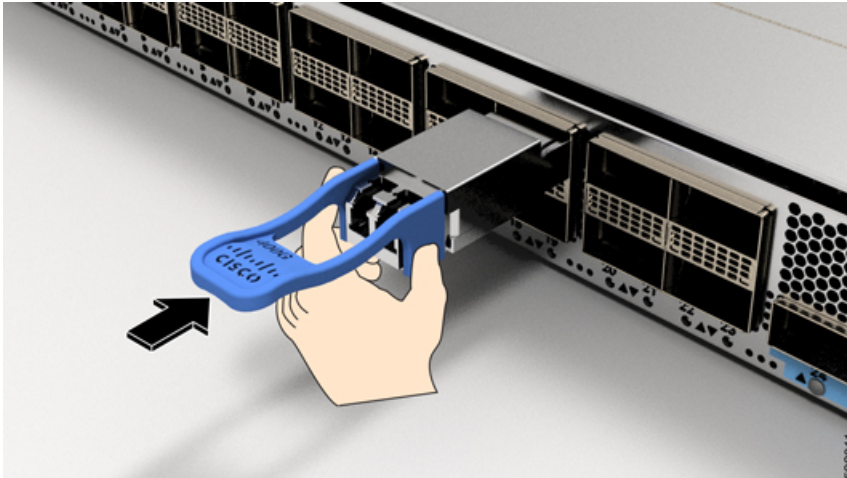


Note The 8201-32FH fixed-port router must be operated only with 2kW power supplies while using the QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules. These optical modules are not supported when 1.4KW power supplies are used.

The QSFP transceiver module has a pull-tab latch. To install a transceiver module, follow these steps:

-
- Step 1** Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.
 - Step 2** Remove the transceiver module from its protective packaging.
 - Step 3** Check the label on the transceiver module body to verify that you have the correct model for your network. Do not remove the dust plug until you're ready to attach the network interface cable. Dust plug is not shown in the images.
 - Step 4** Hold the transceiver by the pull-tab so that the identifier label is on the top.
 - Step 5** Align the transceiver module in front of the module's transceiver socket opening and carefully slide the transceiver into the socket until the transceiver contact with the socket electrical connector.

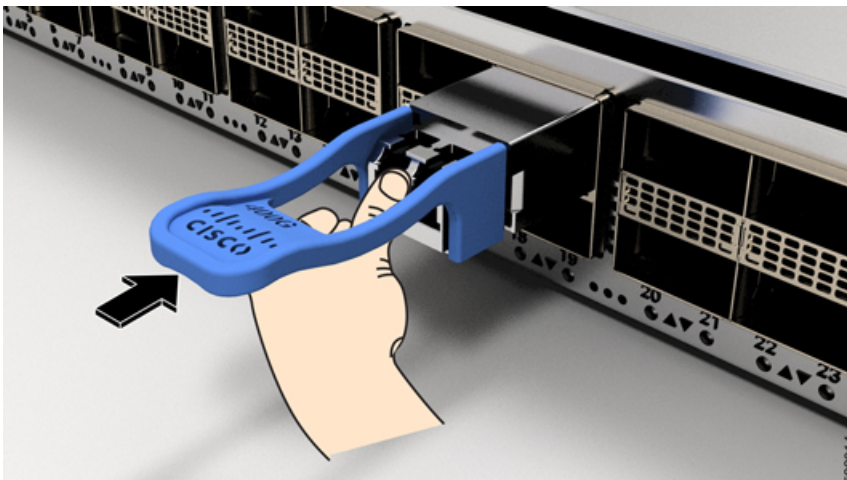
Figure 12: Installing the QSFP Transceiver Module



Step 6 Press firmly on the front of the transceiver module with your thumb to fully seat the transceiver in the module's transceiver socket (see the below figure).

Caution If the latch isn't fully engaged, you might accidentally disconnect the transceiver module.

Figure 13: Seating the QSFP Transceiver Module



Attach the Optical Network Cable

Before you begin

Before you remove the dust plugs and make any optical connections, follow these guidelines:

- Keep the protective dust plugs installed in the unplugged fiber-optic cable connectors and in the transceiver optical bores until you are ready to make a connection.
- Inspect and clean the optical connector end faces just before you make any connections.

- Grasp the optical connector only by the housing to plug or unplug a fiber-optic cable.



Note The transceiver modules and fiber connectors are keyed to prevent incorrect insertion.



Note The multiple-fiber push-on (MPO) connectors on the optical transceivers support network interface cables with either physical contact (PC) or ultra-physical contact (UPC) flat polished face types. The MPO connectors on the optical transceivers do not support network interface cables with an angle-polished contact (APC) face type.

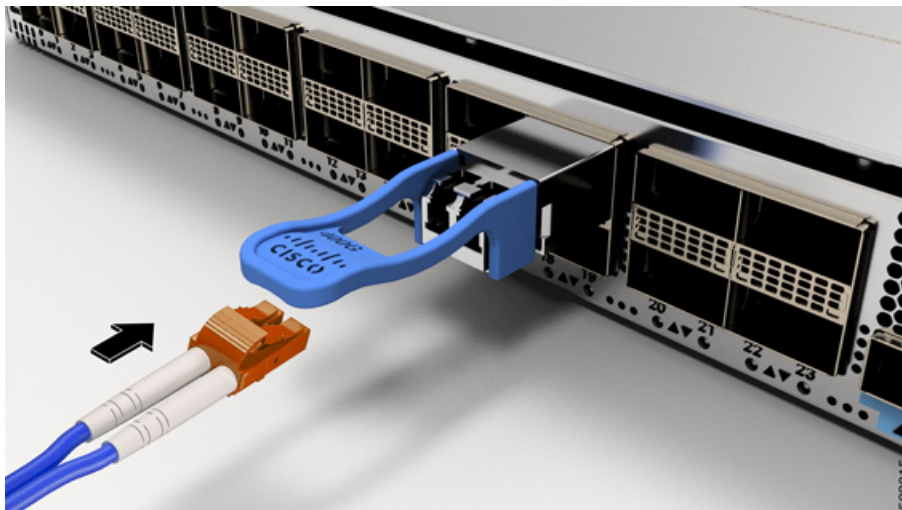


Note Inspect the MPO connector for the correct cable type, cleanliness, and any damage. For complete information on inspecting and cleaning fiber-optic connections, see the [Inspection and Cleaning Procedures for Fiber-Optic Connections](#) document.

Step 1 Remove the dust plugs from the optical network interface cable MPO connectors and from the transceiver module optical bores. Save the dust plugs for future use.

Step 2 Attach the network interface cable MPO connectors immediately to the transceiver module.

Figure 14: Cabling a Transceiver Module



Removing the Transceiver Module



Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with modules.

To remove a transceiver module, follow these steps:

- Step 1** Disconnect the network interface cable from the transceiver connector.
- Step 2** Install the dust plug immediately into the transceiver's optical bore.
- Step 3** Grasp the pull-tab and gently pull to release the transceiver from the socket.

Figure 15: Removing the QSFP Transceiver Module

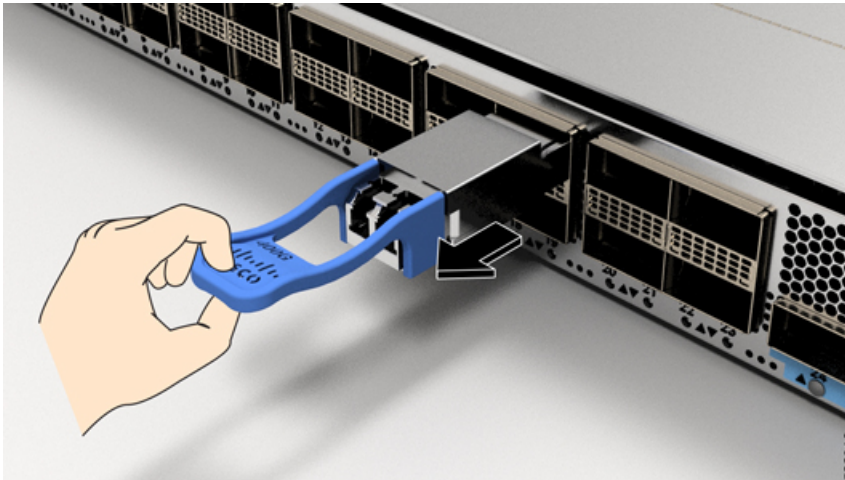
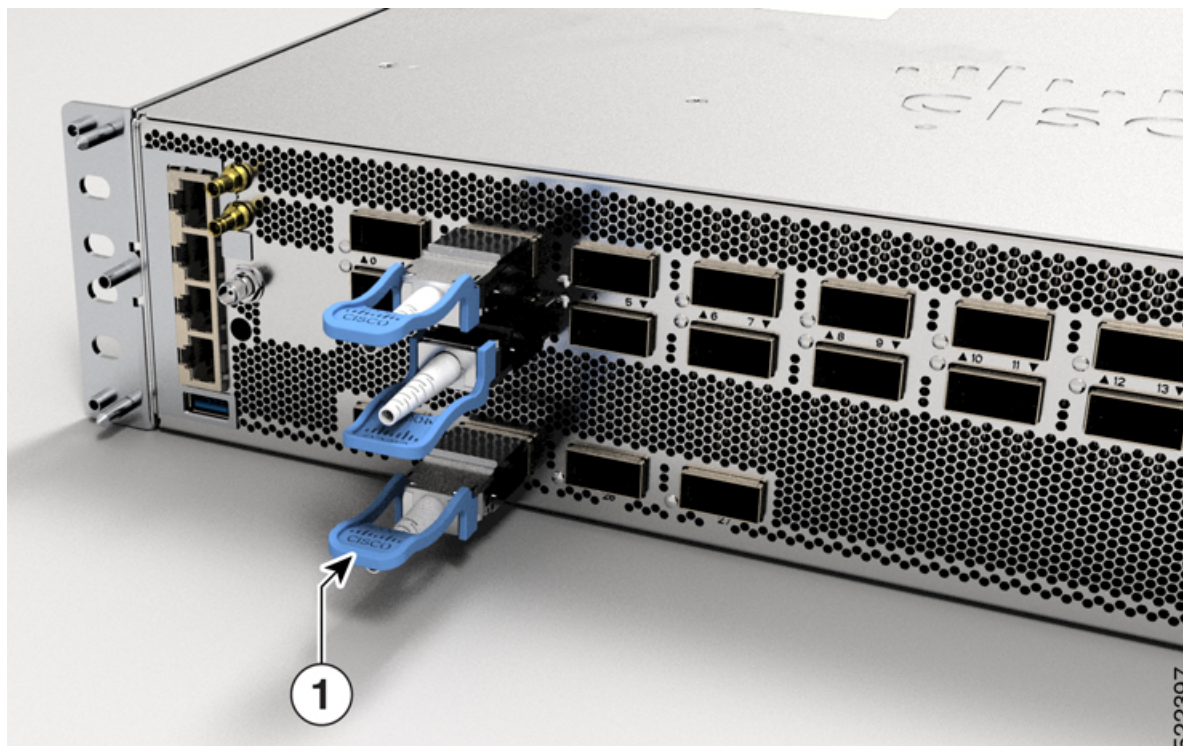


Figure 16: Removing the QSFP Transceiver Module from Cisco 8202-32FH-M Router



1	Grasp the pull-tab and gently pull to release the transceiver from the socket.
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Step 4 Slide the transceiver out of the socket.

Step 5 Place the transceiver module into an antistatic bag.

Connect Interface Ports

You can connect optical interface ports with other devices for network connectivity.

Connect a Fiber-Optic Port to the Network

40G, 100G, 2x100G, or 400G transceivers are supported on Cisco 8200 series routers. Some transceivers work with fiber-optic cables that you attach to the transceivers and other transceivers work with pre-attached copper cables. You must install a transceiver in the port before installing the fiber-optic cable in the transceiver.



Caution Removing and installing a transceiver can shorten its useful life. Do not remove and insert transceivers any more than is absolutely necessary. We recommend that you disconnect cables before installing or removing transceivers to prevent damage to the cable or transceiver.

Disconnect Optical Ports from the Network

When you need to remove fiber-optic transceivers, you must first remove the fiber-optic cables from the transceiver before you remove the transceiver from the port.

Maintain Transceivers and Optical Cables

Refer to [Inspection and Cleaning Procedures for Fiber-Optic Connections](#) document for inspection and cleaning processes for fiber optic connections.

Verify Chassis Installation

After installing the chassis, use the following **show** commands to verify the installation and configuration in the EXEC mode. If you detect any issues, take corrective action before making further configurations.

Command	Description
show platform	Displays the operational status of the node.
show inventory	Displays information about the field replaceable units (FRUs), including product IDs, serial numbers, and version IDs.
show environment	Displays all the environment-related router information.

Command	Description
show environment temperature	<p>Displays temperature readings from the various sensors on the router. Each system controller has temperature sensors with two thresholds:</p> <ul style="list-style-type: none"> • Minor temperature threshold – When a minor threshold is exceeded, a minor alarm occurs and the following actions occur for all temperature thresholds: <ul style="list-style-type: none"> • displays system messages • sends SNMP notifications (if configured) • log environmental alarm event that can be reviewed by running the show alarms command. Users can use the show alarms brief system active command to verify active alarms in the system. • Major temperature threshold – When a major threshold is exceeded, a major alarm occurs and the following actions occur: <ul style="list-style-type: none"> • displays system messages • sends SNMP notifications (if configured) • log environmental alarm event that can be reviewed by running the show alarms command. Users can use the show alarms brief system active command to verify active alarms in the system. • Critical temperature threshold – When a critical threshold is exceeded, a critical alarm occurs and the following actions occur: <ul style="list-style-type: none"> • displays system messages. • sends SNMP notifications (if configured). • logs environmental alarm event that can be reviewed by running the show alarms command. Users can use the show alarms brief system active command to verify active alarms in the system. • triggers a chassis shutdown.
show environment power	Displays power usage information for entire router.
show environment voltage	Displays voltage for entire router.
show environment current	Displays current reading from various sensors.
show environment fan	Displays status of fan trays.
show media	Displays media information of the node.

